LISTING OF THE CLAIMS

1-58. (Canceled)

59. (Previously Presented) A method of making an engineered blood vessel comprising an endothelial intimal layer surrounded by a smooth muscle medial layer, said method comprising contacting one or more factors with a matrix that is combined with endothelial cells and smooth muscle cells, wherein neither said endothelial cells combined with said matrix nor said smooth muscle cells combined with said matrix is exposed to said factors prior to combining both said endothelial cells and said smooth muscle cells with said matrix, said matrix that is combined with said endothelial cells and smooth muscle cells being circumferentially positioned around a tubular support, said factors being contained inside of said tubular support, wherein said support allows said one or more factors to move from the inside of said tubular support to said endothelial cells and smooth muscle cells in combination with said matrix, wherein said contacting results in the formation of said endothelial intimal layer surrounded by said smooth muscle medial layer, and wherein said one or more factors comprises:

i) one or more mitogenic factors and one or more attractant factors; and/or

ii) one or more mitoattractant factors.

60. (Previously Presented) The method of claim 59, wherein the endothelial cells are derived from stem cells.

61. (Previously Presented) The method of claim 60, wherein the stem cells are selected from the group consisting of embryonic stem cells, embryonic germ cells, non-embryonic cells that can form progeny of at least two germ layers, hematopoietic stem cells, mesenchymal stem cells, and endothelial progenitor cells.

62. (Previously Presented) The method of claim 59, wherein the smooth muscle cells are derived from stem cells.

63. (Previously Presented) The method of claim 62, wherein the stem cells are selected from the group consisting of embryonic stem cells, embryonic germ cells, non-embryonic cells that can form progeny of at least two germ layers, mesenchymal stem cells, and smooth muscle progenitor cells.

64. (Previously Presented) The method of claim 60, wherein the stem cells are derived from bone marrow, brain, spinal cord, umbilical cord blood, liver, muscle, fat or placenta.

65. (Previously Presented) The method of claim 59, wherein the matrix is comprised of a substance selected from the group consisting of fibrin, collagen, amphiphilic di-block copolymers, amphiphilic tri-block copolymers, and peptides.

66. (Previously Presented) The method of claim 59, wherein the support comprises porous plastic.

67. (Previously Presented) The method of claim 59, wherein the one or more mitoattractant factors is vascular endothelial growth factor.

68-76. (Canceled)

77. (Previously Presented) A method of culturing cells in a matrix, comprising the steps of:

a) combining endothelial cells and smooth muscle cells with a matrix, wherein neither said endothelial cells nor said smooth muscle cells are cultured with said matrix prior to combining said endothelial cells and said smooth muscle cells with said matrix;

b) growing said combination of endothelial cells, smooth muscle cells, and matrix on the exterior surface of a tubular support, wherein said tubular support allows movement of one or more factors within said tubular support to said combination of endothelial cells, smooth muscle cells, and matrix; and

c) allowing movement of said one or more factors within said tubular support to said combined endothelial cells and smooth muscle cells in said matrix, wherein said one or more factors are comprised of:

i) one or more mitogenic factors and one or more attractant factors; and/or

ii) one or more mitoattractant factors.